

## An Annotated List of New York Siphonaptera

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**Abstract:** Geary (1959) listed 42 species of Siphonaptera from New York. The present list includes numerous additional distributional records, and adds three species to Geary's list: *Peromyscopsylla h. hamifer* (Rothschild), *Ceratophyllus diffinis* Jordan (previously reported but missed by Geary), and *Epitedia (cavernicola* Traub?). Geary also removed from the state list *Echidnophaga gallinacea* (Westwood), but we consider the published record to be a valid one.

New York is one of the most thoroughly studied of states with respect to its flea fauna. Many of the specimens studied by Carl F. Baker near the turn of the century were from New York, largely through the collecting of G. S. Miller, Jr., whose home was in Madison county. The type localities of four fleas described by Baker are in that vicinity, and seven other forms have been described from type localities in New York.

The first state list of fleas from any eastern state was that of Stewart (1928), listing 26 species from New York. Jordan (1929) made some corrections which reduced Stewart's list to 22, and added nine more species, bringing the list to 31 forms. He predicted that about 50 species would eventually be discovered in the state, and presented a hypothetical list comprising 11 species. Of these, seven have since been recorded in the state, two are not to be expected in light of current knowledge, and two remain on the hypothetical list.

Stewart (1933) revised the list once again, recording 36 forms and including one which Jordan had discredited in 1929. Fox (1940) based his New York list primarily on the 1933 list of Stewart, adding three species and eliminating one species and one subspecies. His list thus totalled 37 forms.

The most recent summary of New York collections was that of Geary (1959), which included 42 forms with definite records and four species which had been previously recorded but which Geary considered to be of doubtful validity.

Since 1960, we have had access to more than 4,000 flea specimens from New York, covering many areas which had been poorly represented in collections up to that time. We are grateful to the New York State Museum and Science Service and Dr. Paul Connor for the use of collections from Lewis, Otsego, Schoharie, St. Lawrence and Suffolk counties. In addition, more than a thousand specimens from the Catskill Mountain area have been loaned by Daniel Smiley, John New and Robert Fisher. Numerous students and friends have supplied additional collections and have assisted in the preparation of specimens. Part of the work has been supported by grants from the Research

Foundation of State University of New York, the Atmospheric Sciences Research Center of State University of New York, and Health Research Incorporated, Albany, N. Y.

The present list is undoubtedly incomplete, and it is likely that Jordan's estimate of about 50 species is extremely accurate. Although much remains to be learned about local and ecological distribution, it is unlikely that more than a half-dozen species remain to be discovered within the state.

Nomenclature of the Siphonaptera follows the classification of Hopkins and Rothschild (1953 et seq.) so far as available, except for a few taxonomic changes which have occurred since the pertinent volume was published. Mammal names follow Hall and Kelson (1959). Host relationship data follow the plan of Sakaguti and Jameson (1962): true hosts permit the flea to carry out its life cycle indefinitely; secondary hosts are commonly parasitized, but are not considered biologically adequate as permanent hosts; accidental hosts are those which result from accidental coming together of host and parasite, and such relationships are not likely to occur frequently. Since our knowledge of host relationships is far from complete, these designations should be taken as considered opinions, which may prove to be wrong in the light of further data.

Host records listed are those which are known from New York. In most cases, the true host is the same throughout the range of the species, but this is not always true. In New York, for example, *Monopsyllus vison* is rarely found on any host except the red squirrel. In Minnesota, however, large numbers occur on the eastern chipmunk, and the species is known from southern Illinois, beyond the range of the red squirrel. It is evident that host relationships as they occur in our area are not necessarily the same throughout the range of the flea in question.

The most serious gap in our knowledge of flea distribution is the almost complete lack of information about the influence of factors other than the presence of the host. The puzzling distribution patterns of such species as *Stenoponia americana*, *Peromyscopsylla scotti*, *Peromyscopsylla hamifer* and others cannot be explained on the basis of host distribution. Detailed study of the life history and ecology of almost any flea species would be extremely rewarding, but such studies have been undertaken for only a few species which have great medical or veterinary importance.

#### FAMILY PULICIDAE

##### *Echidnophaga gallinacea* (Westwood)

This species is included on the basis of a record reported by Fox and Sullivan (1925). While there is probably no resident population within the state, we see no reason to doubt the validity of this record, or to doubt that the species may occasionally be brought into the state on rats or domestic animals.

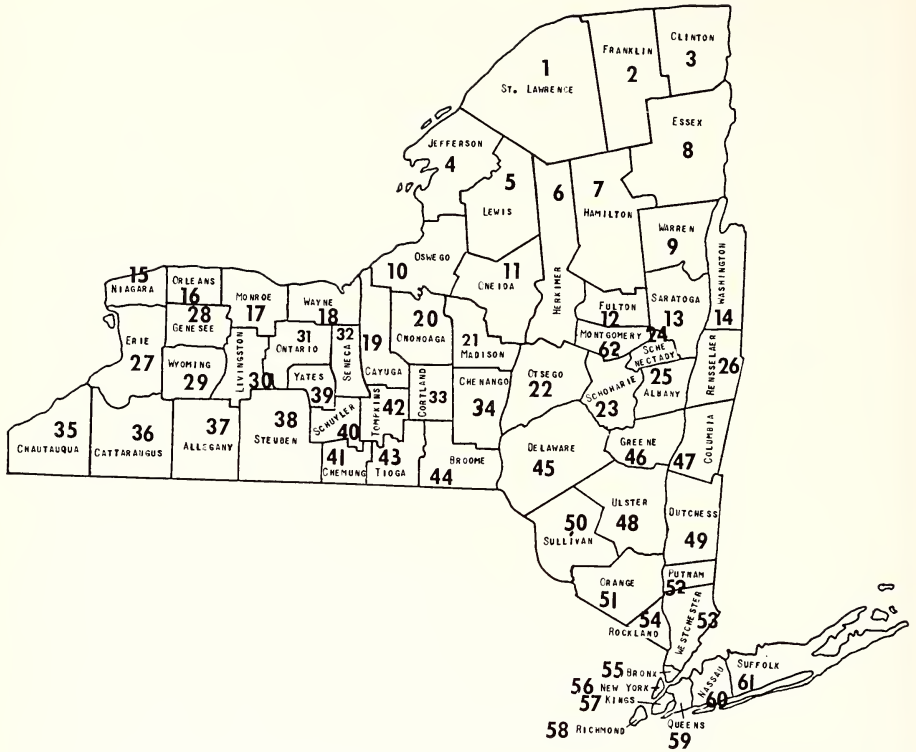


FIG. 1. Map of New York State showing counties. Numbers are the code used for distributional data under species accounts.

Host: *Rattus* sp.

County: 56<sup>1</sup>.

Range within the state: Probably restricted to occasional accidental introductions

### *Pulex irritans* Linnaeus

Although human fleas are undoubtedly brought into the state often, records are few. We have not seen specimens from the state, and thus cannot evaluate the possibility that some or all of the records may refer to *P. simulans* Baker.

True host: *Homo sapiens*

Counties: 22, 24, 26

Range within the state: Unknown; possibly there is no permanent population

<sup>1</sup>The map of New York, Figure 1, has the counties coded by number for economy of space. Please refer to this map for identification of the counties indicated in the species accounts.

*Ctenocephalides canis* (Curtis)

True hosts: *Canis familiaris*, *Vulpes fulva*, *Urocyon cinereoargenteus*

Accidental hosts: *Mephitis mephitis*, *Rattus norvegicus*

Counties: 8, 20, 24, 25, 50, 51, 56

Range within the state: Probably all of the state, with the possible exception of the highest elevations

*Ctenocephalides felis felis* (Bouché)

True hosts: *Felis domestica*, *Canis familiaris*, *Vulpes fulva*, *Urocyon cinereoargenteus*

Secondary host: *Homo sapiens*

Accidental hosts: *Blarina brevicauda*, *Didelphis marsupialis*, *Procyon lotor*, *Rattus norvegicus*, *Sylvilagus floridanus*, *Tamiasciurus hudsonicus*

Counties: 2, 7, 11, 13, 17, 19, 20, 21, 24, 25, 26, 28, 35, 36, 38, 42, 47, 50, 53, 56

Range within the state: Throughout the state.

*Cediopsylla simplex* (Baker)

This species occurs in great numbers on all species of Leporidae occurring within the state. In the higher mountains of the Adirondacks, however, where *Sylvilagus floridanus* does not occur, we have been unable to find this flea. Whether its absence is due to the absence of the cottontail, or whether it is due to some other ecological factor, is not yet clear.

True hosts: *Sylvilagus floridanus*, *S. transitionalis*, *Lepus americanus*, *L. europaeus*

Secondary and accidental hosts: *Canis familiaris*, *Didelphis marsupialis*, *Felis domestica*, *Mustela frenata*, *Rattus norvegicus*, *Tamiasciurus hudsonicus*

Counties: 2, 9, 10, 19, 20, 21, 22, 23, 25, 26, 27, 30, 31, 35, 36, 42, 44, 45, 46, 47, 48, 49, 50, 52, 56, 61

Range within the state: Throughout the state, except for the higher mountain areas. Additional collecting at high elevations is needed to determine whether it is indeed absent from those areas.

*Xenopsylla cheopis* (Rothschild)

The Oriental rat flea is the major carrier of bubonic plague, and is therefore of great medical importance. Undoubtedly, the species is brought into the state occasionally on rats, but the records are so few as to suggest that the species is only a sporadic entrant, but permanent populations may persist in the extreme southeastern counties.



True host: *Rattus norvegicus*

Counties: 20, 56

Range within the state: Uncertain; possibly there is no permanent population

#### FAMILY VERMIPSYLLIDAE

##### *Chaetopsylla lotoris* (Stewart)

Although named for its type host, the raccoon, this species is also very frequently taken from foxes (Zeh, 1973).

True hosts: *Procyon lotor*, *Vulpes fulva*, *Urocyon cinereoargenteus*

Secondary hosts: *Martes pennanti*, *Didelphis marsupialis*

Counties: 7, 15, 17, 18, 19, 25, 26, 29, 30, 42, 45, 46, 49, 50, 51, 52

Range within the state: Throughout the state

#### FAMILY HYSTRICHOPSYLLIDAE

##### *Hystrichopsylla tahavuana* Jordan

True hosts: *Parascalops breweri*, *Condylura cristata*

Secondary host: *Blarina brevicauda*

Accidental hosts: *Microtus pennsylvanicus*, *M. pinetorum*, *Peromyscus leucopus*

Counties: 1, 5, 8, 17, 23, 25, 26, 42, 48

Range within the state: Probably wherever its true hosts occur; because moles are not usually taken in large numbers by collectors, records are relatively few

##### *Atyphloceras bishopi* Jordan

This is a winter flea, most commonly taken from nests, and hence rather rare in collections. Most New York records are from the meadow vole, but it is taken on the red-backed vole in more northern areas.

True hosts: *Microtus pennsylvanicus*, *Clethrionomys gapperi*

Secondary hosts: *Microtus pinetorum*, *M. chrotorrhinus*

Accidental hosts: *Peromyscus leucopus*, *Blarina brevicauda*

Counties: 17, 22, 28, 34, 42, 48

Range within the state: Probably throughout the state; it may have ecological limits as yet unknown

##### *Stenoponia americana* (Baker)

This species shows little host specificity, occurring on a variety of small mammals. Since it occurs up the Atlantic coast as far as New Brunswick,

there seems no reason why it should not occur in parts of New York where it has not yet been recorded.

Hosts: *Peromyscus leucopus*, *Blarina brevicauda*, *Microtus pennsylvanicus*,  
*M. pinetorum*, *Clethrionomys gapperi*, *Sorex cinereus*, *Scalopus aquaticus*

Counties: 25, 48, 61

Range within the state: So far as known, confined to Long Island and the Hudson valley.

*Tamiohila grandis* (Rothschild)

True host: *Tamias striatus*

Accidental hosts: *Tamiasciurus hudsonicus*, *Vulpes fulva*

Counties: 1, 5, 8, 12, 19, 22, 26, 33, 35, 36, 42, 45, 48

Range within the state: Throughout the state

*Catallagia borealis* Ewing

True host: *Clethrionomys gapperi*

Secondary and accidental hosts: *Microtus chrotorrhinus*, *Napcozapus insignis*, *Peromyscus maniculatus*, *Blarina brevicauda*

Counties: 8, 22, 42, 46, 48, 50

Range within the state: Throughout the state where its host occurs

*Epitedia (cavernicola* Traub?)

From Pennsylvania to Alabama, *Epitedia cavernicola* occurs as a nest parasite of the eastern woodrat, *Neotoma floridana*. We have examined one female *Epitedia* from a woodrat, collected by Daniel Smiley in Ulster county. While it does not agree perfectly with *E. cavernicola*, it is obviously not *E. wenmanni*, so we tentatively assign it to this species until further specimens can be secured. It is possible that the population of woodrats in eastern New York is sufficiently isolated to have permitted the development of a distinct species or subspecies of flea.

Host: *Neotoma floridana*

County: 48

Range within the state: Unknown. Woodrats occur only in southeastern counties, so far as known.

*Epitedia faceta* (Rothschild)

True hosts: *Glaucomys volans*, *G. sabrinus*

Secondary host: *Tamiasciurus hudsonicus*

Accidental host: *Mustela* sp.

Counties: 23, 26, 33, 42, 48

Range within the state: Probably throughout the state; it is rarely collected, being primarily a nest flea

*Epitedia wenmanni wenmanni* (Rothschild)

Some authorities have expressed doubt of the validity of the division of this species into two subspecies, whose distribution is unlike that of any other American form. However, the differences in the male genitalia are quite distinct, and both forms, along with intergrades, occur along a line at least to the Rocky Mountains. In New York, the nominate subspecies occupies most of the state, with *E. w. testor* occurring in Long Island, the Hudson valley as far north as Albany county and Rensselaer county. The type locality of *testor* is at Lansingburg, Rensselaer county, an unfortunate occurrence, since intergrades are found only a few kilometers away.

True hosts: *Peromyscus leucopus*, *P. maniculatus*

Secondary hosts: *Microtus pennsylvanicus*, *M. chrotorrhinus*, *Clethrionomys gapperi*, *Napeozapus insignis*, *Parascalops breweri*

Accidental hosts: *Didelphis marsupialis*, *Mustela erminea*, *Sylvilagus* sp., *Urocyon cinereoargenteus*

Counties: 1, 4, 5, 7, 8, 19, 20, 22, 23, 28, 34, 35, 44, 46, 48, 51

Range within the state: All of the state except the Hudson valley and its tributaries and Long Island

*Epitedia wenmanni testor* (Rothschild)

True host: *Peromyscus leucopus*

Secondary and accidental hosts: *Blarina brevicauda*, *Sorex fumeus*, *Clethrionomys gapperi*, *Glaucomys volans*, *Mustela* sp.

Counties: 23, 25, 26, 48, 61

Range within the state: Hudson valley and valleys of its tributaries, and Long Island

*Corrodopsylla hamiltoni* (Traub)

True host: *Cryptotis parva*

Accidental host: *Microtus pennsylvanicus*

Counties: 35, 42

Range within the state: The true host is known from the lake plain of Lake Erie and Lake Ontario, as far north as Oswego county, from parts of the Finger Lakes region, and from Long Island. The flea should be expected throughout these areas.

*Corrodopsylla curvata curvata* (Rothschild)

True hosts: Shrews of the genus *Sorex*; possibly also *Blarina brevicauda*

Accidental host: *Zapus hudsonius*

Counties: 1, 5, 12, 23, 26, 48, 50

Range within the state: Probably throughout the state, though possibly confined to higher elevations or colder sections

*Ctenophthalmus pseudagyrtes pseudagyrtes* Baker

This species appears to be completely non-specific in its choice of hosts, occurring on virtually every mammalian species in the area. It shows some preference for rodents and insectivores, carnivores being, perhaps, accidental hosts.

Hosts: *Sorex fumeus*, *S. cinereus*, *Blarina brevicauda*, *Condylura cristata*, *Scalopus aquaticus*, *Parascalops breweri*, *Peromyscus leucopus*, *P. maniculatus*, *Clethrionomys gapperi*, *Microtus pennsylvanicus*, *M. chrotorrhinus*, *M. pinetorum*, *Synaptomys cooperi*, *Ondatra zibethica*, *Erethizon dorsatum*, *Tamias striatus*, *Tamiasciurus hudsonicus*, *Glaucomys volans*, *Rattus norvegicus*, *Napeozapus insignis*, *Sylvilagus floridanus*, *Mustela erminea*, *M. frenata*, *Mephitis mephitis*, *Vulpes fulva*

Counties: 1, 2, 4, 5, 7, 8, 9, 12, 17, 19, 21, 22, 23, 25, 26, 27, 28, 35, 36, 40, 42, 46, 48, 50, 53, 61

Range within the state: Throughout the state, though scarce or absent at the highest elevations

*Doratopsylla blarinae* C. Fox

True host: *Blarina brevicauda*

Secondary and accidental hosts: *Condylura cristata*, *Parascalops breweri*, *Sorex fumeus*, *S. dispar*, *Microtus pinetorum*, *Peromyscus leucopus*, *Clethrionomys gapperi*, *Napeozapus insignis*, *Tamiasciurus hudsonicus*

Counties: 1, 4, 5, 7, 8, 17, 19, 20, 22, 23, 25, 26, 27, 35, 36, 42, 46, 48, 50, 51, 61

Range within the state: Throughout the state

*Nearctopsylla genalis genalis* (Baker)

The taxonomy of this genus has been a point of disagreement for many years, and many earlier records were referred to *N. g. laurentina*.

True hosts: *Scalopus aquaticus*, *Parascalops breweri*, *Condylura cristata*, *Blarina brevicauda*

Secondary and accidental hosts: *Sorex fumeus*, *Clethrionomys gapperi*, *Synaptomys cooperi*

Counties: 5, 8, 23, 25, 42, 48, 50, 61

Range within the state: Probably throughout the state. No specimens have

been taken in the western counties, but there are records from adjacent counties in western Pennsylvania (Holland and Benton, 1968).

*Conorhinopsylla stanfordi* Stewart

Although the type specimen was found on the red squirrel, this species is typically a parasite of the flying squirrels, *Glaucomys volans* and *G. sabrinus*. Its rarity in collections is probably due to the fact that it is primarily a nest flea, seldom staying on the host when it leaves the nest.

True hosts: *Glaucomys volans*, *G. sabrinus*

Secondary hosts: *Sciurus carolinensis*, *Tamiasciurus hudsonicus*

Accidental host: *Vulpes fulva*

Counties: 19, 23, 42, 48

Range within the state: Unknown at present; its rarity in collections makes it impossible to determine its range accurately

FAMILY CERATOPHYLLIDAE

*Ceratophyllus diffinis* Jordan

Jordan (1937) reported this species from "Long Island," and Parkes (1954) collected one from a robin in Hamilton county, but Geary (1959) was unaware of these earlier records. In addition, we have seen two females from Essex county, in the collection of the New York State College of Environmental Science and Forestry, and one in our own collection taken from a deer mouse in Franklin county.

True hosts: *Hylocichla ustulata*, *Turdus migratorius*

Accidental host: *Peromyscus maniculatus*

Counties: 2, 7, 8, 61(?)

Range within the state: Unknown at present

*Ceratophyllus gallinae* (Schrank)

True hosts: *Gallus gallus*, *Passer domesticus*, *Troglodytes aedon*

Accidental hosts: *Tamias striatus*, *Canis familiaris*, *Homo sapiens*, *Rattus norvegicus*, *Peromyscus maniculatus*

Counties: 8, 12, 15, 17, 20, 29, 35, 42, 47, 48, 50, 53, 61

Range within the state: Throughout the state

*Ceratophyllus celsus celsus* Jordan

True hosts: *Petrochelidon pyrrhonota*, *Riparia riparia*

Counties: 21, 25, 26

Range within the state: Probably wherever cliff swallows nest, although none were present in numerous nests from Essex county



*Ceratophyllus idius* Jordan and Rothschild

True hosts: *Progne subis*, *Iridoprocne bicolor*

Accidental host: *Troglodytes aedon*

Counties: 2, 4, 25, 27, 35

Range within the state: Probably throughout the state

*Ceratophyllus styx riparius* (Jordan and Rothschild)

True hosts: *Riparia riparia*, *Stelgidopteryx rufipennis*

Secondary and accidental hosts: *Hirundo rustica*, *Megaceryle alcyon*, *Sturnus vulgaris*

Counties: 2, 8, 18, 19, 21, 27, 35, 36, 42

Range within the state: Throughout the state

*Megabothris acerbus* (Jordan)

True host: *Tamias striatus*

Secondary host: *Tamiasciurus hudsonicus*

Accidental hosts: *Napeozapus insignis*, *Microtus pennsylvanicus*, *Sciurus carolinensis*, *Marmota monax*, *Sylvilagus floridanus*

Counties: 1, 5, 7, 8, 12, 19, 20, 23, 26, 27, 36, 42, 48

Range within the state: The true host occurs throughout the state, but we have made or examined extensive collections in several counties which failed to produce this species. Apparently ecological factors limit its distribution

*Megabothris asio asio* (Baker)

True host: *Microtus pennsylvanicus*

Secondary host: *Microtus chrotorrhinus*

Accidental hosts: *Mustela erminea*, *Blarina brevicauda*, *Zapus hudsonius*, *Synaptomys cooperi*, *Clethrionomys gapperi*, *Sylvilagus floridanus*, *Vulpes fulva*

Counties: 1, 4, 8, 17, 19, 20, 23, 25, 26, 27, 35, 42, 50, 53, 61

Range within the state: Throughout the state

*Megabothris quirini* (Rothschild)

Although its host is common in suitable habitats throughout the state, this species is unaccountably rare in western counties. The species was also absent from extensive collections in western Pennsylvania (Holland and Benton, 1968). A single collection from a gray fox in Livingston county is the only record from the western half of the state.

True host: *Clethrionomys gapperi*

Secondary and accidental hosts: *Microtus chrotorrhinus*, *M. pennsylvanicus*,

*Peromyscus leucopus*, *P. maniculatus*, *Napeozapus insignis*, *Urocyon cinereoargenteus*

Counties: 5, 7, 8, 26, 30, 46, 48, 50

Range within the state: Would be expected throughout the state, but see above

*Monopsyllus vison* (Baker)

True hosts: *Tamiasciurus hudsonicus*, *Tamias striatus*

Accidental hosts: *Mustela vison*, *M. frenata*, *Procyon lotor*, *Peromyscus maniculatus*, *Vulpes fulva*

Counties: 1, 2, 5, 7, 8, 9, 19, 20, 21, 22, 23, 26, 33, 36, 42

Range within the state: Throughout the state except for Long Island and the lower Hudson valley

*Nosopsyllus fasciatus* (Bosc)

True host: *Rattus norvegicus*

Accidental hosts: *Microtus pennsylvanicus*, *Mustela frenata*, *Vulpes fulva*, *Tamiasciurus hudsonicus*, *Didelphis marsupialis*

Counties: 19, 21, 25, 26, 35, 42, 56, 61

Range within the state: Throughout the state

*Orchopeas caedens durus* (Jordan)

This transcontinental species is a northern form, and has thus far been taken only in the Adirondack counties in this state. It might reasonably be expected in the high Catskills and in the Alleghenies, but no records are currently available from these areas.

True host: *Tamiasciurus hudsonicus*

Secondary host: *Tamias striatus*

Accidental host: *Peromyscus maniculatus*

Counties: 1, 2, 3, 4, 5, 6, 7, 8

Range within the state: Adirondack and Tug Hill counties at elevations above 1000 feet

*Orchopeas howardii howardii* (Baker)

True hosts: *Sciurus carolinensis*, *S. niger*

Secondary hosts: *Tamias striatus*, *Tamiasciurus hudsonicus*, *Glaucomys volans*, *G. sabrinus*

Accidental hosts: *Blarina brevicauda*, *Procyon lotor*, *Urocyon cinereoargenteus*, *Mustela erminea*, *M. vison*, *M. frenata*, *Didelphis marsupialis*, *Myocastor coypu*, *Marmota monax*, *Peromyscus maniculatus*, *P. leucopus*,

*Synaptomys cooperi*, *Clethrionomys gapperi*, *Sylvilagus floridanus*, *Vulpes fulva*, *Urocyon cinereoargenteus*

Counties: 1, 2, 4, 6, 7, 8, 9, 13, 19, 20, 22, 23, 25, 26, 33, 35, 36, 42, 45, 47, 48, 49, 50, 53, 56, 61

Range within the state: Throughout the state except at high elevations where its principal hosts do not occur

*Orchopeas leucopus* (Baker)

True hosts: *Peromyscus leucopus*, *P. maniculatus*

Secondary and accidental hosts: *Microtus pennsylvanicus*, *M. pinetorum*, *Clethrionomys gapperi*, *Neotoma floridana*, *Zapus hudsonius*, *Napeozapus insignis*, *Tamias striatus*, *Tamiasciurus hudsonicus*, *Marmota monax*, *Sciurus carolinensis*, *Glaucomys volans*, *Didelphis marsupialis*, *Blarina brevicauda*, *Mustela erminea*, *Urocyon cinereoargenteus*, *Sylvilagus floridanus*

Counties: 1, 2, 3, 5, 7, 8, 12, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 33, 34, 35, 36, 42, 46, 47, 48, 49, 50, 51, 53, 61

Range within the state: Throughout the state

*Orchopeas sexdentatus pennsylvanicus* (Jordan)

True host: *Neotoma floridana*

Counties: 48, 51

Range within the state: Those areas of southeastern New York where the wood rat occurs

*Opisodasys pseudarctomys* (Baker)

True hosts: *Glaucomys volans*, *G. sabrinus*

Secondary and accidental hosts: *Tamiasciurus hudsonicus*, *Marmota monax*

Counties: 1, 6, 8, 21, 22, 23, 26, 42, 48

Range within the state: Throughout the state

*Oropsylla arctomys* (Baker)

True host: *Marmota monax*

Secondary and accidental hosts: *Didelphis marsupialis*, *Vulpes fulva*, *Urocyon cinereoargenteus*, *Mephitis mephitis*, *Canis latrans*, *Sylvilagus floridanus*, *Erethizon dorsatum*, *Tamiasciurus hudsonicus*, *Dama virginiana*, *Homo sapiens*

Counties: 1, 2, 3, 4, 8, 10, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 30, 31, 32, 33, 35, 36, 39, 42, 45, 47, 48, 49, 50, 51, 52, 53, 61

Range within the state: Throughout the state

## FAMILY LEPTOPSYLLIDAE

*Leptopsylla segnis* (Schonherr)

The only records of this species are very old, and it seems unlikely that there is any permanent population in the state, though it must often be brought in by its hosts.

True host: *Mus musculus*

Secondary host: *Rattus norvegicus*

County: 56

Range within the state: Thus far collected only in New York City

*Peromyscopsylla catatina* (Jordan)

True host: *Clethrionomys gapperi*

Secondary hosts: *Microtus chrotorrhinus*, *M. pennsylvanicus*

Accidental hosts: *Blarina brevicauda*, *Parascalops breweri*

Counties: 1, 5, 7, 8, 21, 23, 26, 42, 45, 46, 48, 50

Range within the state: Probably throughout the state, although not yet taken in western counties, where its host occurs

*Peromyscopsylla hamifer hamifer* (Rothschild)

True host: *Synaptomys cooperi*

County: 1

Range within the state: Should occur on Microtinae throughout the state, but evidently has precise ecological requirements (Miller and Benton, 1970)

*Peromyscopsylla hesperomys hesperomys* (Baker)

True hosts: *Peromyscus leucopus*, *P. maniculatus*

Secondary hosts: *Microtus pennsylvanicus*, *M. chrotorrhinus*, *Clethrionomys gapperi*, *Blarina brevicauda*

Accidental hosts: *Neotoma floridana*, *Tamiasciurus hudsonicus*

Counties: 4, 8, 12, 17, 19, 20, 22, 23, 26, 27, 35, 36, 40, 42, 46, 48, 50

Range within the state: Throughout the state except on Long Island, where extensive trapping has not yet revealed it

*Peromyscopsylla scotti* (I. Fox)

True host: *Peromyscus leucopus*

Secondary and accidental hosts: *Blarina brevicauda*, *Microtus pennsylvanicus*

Counties: 25, 42, 48, 61

Range within the state: Long Island and the Hudson valley, with an isolated record from Tompkins county; apparently has precise ecological requirements, replacing the previous species in appropriate areas.

*Odontopsyllus multispinosus* (Baker)

True host: *Sylvilagus floridanus*

County: Suffolk

Range within the state: Long Island, probably lower Hudson valley

## FAMILY ISCHNOPSYLLIDAE

*Nycteridopsylla chapini* (Jordan)

True host: *Eptesicus fuscus*

County: 62

Range within the state: Unknown; its host occurs throughout the state, but this flea occurs only in certain types of caves

*Myodopsylla insignis* (Rothschild)

True host: *Myotis lucifugus*

Secondary hosts: *Myotis subulatus*, *Eptesicus fuscus*

Counties: 7, 11, 20, 23, 33, 36, 42

Range within the state: Throughout the state

## Hypothetical List

The following species have been taken from states or provinces adjacent to New York, on hosts which occur in New York. Thus it is reasonable to expect that they may eventually be found within the state.

## PULICIDAE

*Hoplopsyllus glacialis lynx* (Baker). Taken in Vermont from the snowshoe hare, *Lepus americanus*

## HYSTRICHOPSYLLIDAE

*Rhadinopsylla orama* Smit. Taken in Pennsylvania and Connecticut from the pine vole, *Microtus pinctorum*

## CERATOPHYLLIDAE

*Ceratophyllus rossitensis swansoni* (Liu). Taken in Ontario, Canada from nests of the crow, *Corvus brachyrhynchos*

*Ceratophyllus garei* Rothschild. Taken in Quebec, Canada, from "eider down," which probably simply means a duck nest. It occurs in dry or bulky nests, most often on the ground.

## Literature Cited

FOX, CARROLL, AND E. C. SULLIVAN. 1925. A comparative study of rat-flea data for several seaports of the United States. Publ. Health Repts., **40**: 1909-1934.



- FOX, I. 1940. The fleas of eastern United States. Iowa State College Press, Ames, Iowa. 191 pp.
- GEARY, JOHN M. 1959. The fleas of New York. Cornell Univ. Agric. Exp. Sta. Memoir **355**: 104 pp.
- HALL, E. RAYMOND, AND KEITH KELSON. 1959. The mammals of North America. The Ronald Press Co., N. Y. Vol. **1**: 1-546; Vol. **2**: 547-1083.
- HOLLAND, G. P., AND A. H. BENTON. 1968. Siphonaptera from Pennsylvania mammals. Amer. Midland Naturalist, **80**: 252-261.
- HOPKINS, G. H. E., AND MIRIAM ROTHSCHILD. 1953-1971. An illustrated catalogue of the Rothschild collection of fleas (Siphonaptera) in the British Museum (Natural History). Vol. 1: Tungidae and Pulicidae, 1953, xv + 361 pp.; Vol. 2: Vermipsyllidae to Xiphopsyllidae, 1956, xi + 560 pp.; Vol. 3: Hystrichopsyllidae (in part), 1961, ix + 560 pp.; Vol. 4: Hystrichopsyllidae (in part), 1966, viii + 549 pp.; Vol. 5: Leptopsyllidae and Ancistropsyllidae, 1971, viii + 530 pp. British Museum Nat. Hist., London.
- JORDAN, KARL. 1929. On a small collection of Siphonaptera from the Adirondacks with a list of the species known from the state of New York. Novit. Zool., **35**: 168-177.
- . 1937. On some North American Siphonaptera. Novit. Zool., **40**: 262-271.
- MILLER, DONALD H., AND ALLEN H. BENTON. 1970. Ecological factors in the distribution of *Peromyscopsylla h. hamifer* (Rothschild). Amer. Midland Naturalist, **83**: 301-303.
- PARKES, KENNETH C. 1954. Notes on some birds of the Adirondack and Catskill Mountains, New York. Annals Carnegie Mus., Art. **7**: 178 pp.
- SAKAGUTI, K., AND E. W. JAMESON, JR. 1962. The Siphonaptera of Japan. Bernice P. Bishop Mus., Pac. Insects Monograph **3**: 169 pp.
- STEWART, M. A. 1928. Siphonaptera. In "A list of the insects of New York," by M. D. Leonard. Cornell Univ. Agric. Exp. Sta. Memoir **101**: 1868-1869.
- . 1933. Revision of the list of Siphonaptera from New York State. J. N. Y. Entomol. Soc., **41**: 253-262.
- ZEH, JOHN B. 1973. A survey of the ectoparasitic fauna of the red fox, *Vulpes fulva* (Desmarest) and the gray fox, *Urocyon cinereoargenteus* (Schreber). Unpublished thesis, State Univ. College, Geneseo, New York: 71 pp.